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**UTILITY PATENT APPLICATION TRANSMITTAL**  
**(Large Entity)***(Only for new nonprovisional applications under 37 CFR 1.53(b))*Docket No.  
000-009A

Total Pages in this Submission

**TO THE ASSISTANT COMMISSIONER FOR PATENTS**Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

LENS

and invented by:

SEVASTIAN; Nick  
NELSON; James E., V.P. The Gates CorporationIf a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Enclosed are:

**Application Elements**

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 10 pages and including the following:
  - a. ☒ Descriptive Title of the Invention
  - b. ☐ Cross References to Related Applications *(if applicable)*
  - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
  - d. ☐ Reference to Microfiche Appendix *(if applicable)*
  - e. ☒ Background of the Invention
  - f. ☒ Brief Summary of the Invention
  - g. ☒ Brief Description of the Drawings *(if drawings filed)*
  - h. ☒ Detailed Description
  - i. ☒ Claim(s) as Classified Below
  - j. ☒ Abstract of the Disclosure

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**Application Elements (Continued)**

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☐ Formal                      Number of Sheets \_\_\_\_\_
- b. ☒ Informal                      Number of Sheets 2
4. ☒ Oath or Declaration
- a. ☒ Newly executed *(original or copy)*      ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☒ With Power of Attorney      ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application,  
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under  
Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby  
incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy *(identical to computer copy)*
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

**Accompanying Application Parts**

8. ☐ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☒ Information Disclosure Statement/PTO-1449      ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class      ☒ Express Mail *(Specify Label No.):* EL574703067US

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**(Large Entity)**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.

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Total Pages in this Submission

**Accompanying Application Parts (Continued)**

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. ☒ Additional Enclosures (please identify below):

Rule 37 CFR 1.47(b) Petition plus Exhibits A thru D.  
Affidavit of Frank Byrne


**Fee Calculation and Transmittal**

**CLAIMS AS FILED**

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	8	- 20 =	0	x \$18.00	\$0.00
Indep. Claims	3	- 3 =	0	x \$78.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$690.00
OTHER FEE (specify purpose)					
TOTAL FILING FEE					\$690.00

- ☐ A check in the amount of \_\_\_\_\_ to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 07-0475 as described below. A duplicate copy of this sheet is enclosed.
- ☒ Charge the amount of \$690.00 as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: JULY 13, 2000

  
Signature  
Jeffrey Thurnau, Reg. No. 42,183  
The Gates Corporation  
900 S. Broadway  
Denver, CO 80209

cc:

**CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)**

Applicant(s): SEVASTIAN; Nick, NELSON; James E., V.P. General Counsel

Docket No.

000-009A

Serial No.

Filing Date

Examiner

Group Art Unit

Invention:

"LENS"



I hereby certify that this **NON-PROVISIONAL UTILITY PATENT APPLICATION**  
(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under  
37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on

July 13, 2000  
(Date)

Sonja L. Faller

(Typed or Printed Name of Person Mailing Correspondence)

Sonja L. Faller  
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Box Patent Application, Assistant Commissioner for Patents,  
Washington, D.C. 20231 on July 13, 2000 For: The Gates Corporation

Signature *Jonja K. Lallu* Date signed: *July 13, 2000*



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

The Gates Corporation  
Rule 47(b) Applicant  
a Delaware Corporation,  
and  
Nick Sevastian,  
a natural person.

Cover Letter for  
Application Filed  
Under 37 C.F.R. 1.47(b)

Filed:

Serial No.:

For: LENS

BOX Patent Application  
Assistant Commissioner for Patents  
Washington, DC 20231

Dear Sirs:

The attached Non-provisional Application entitled "Lens" is hereby filed pursuant  
to 37 C.F.R. 1.47(b) by the Applicant, The Gates Corporation dba The Gates Rubber  
Company, a Delaware Corporation.

Respectfully submitted,

*Jeffrey A. Thurnau* July 13, 2000  
Jeffrey A. Thurnau  
Attorney for Applicant/Reg. No. 42,183  
303 744-4743

004720-9429560

render a marker lens invisible when not is use. The present invention meets these needs.

### Summary of the Invention

5       The primary aspect of the invention is to provide a lens comprising an array of fiber optic cable strands.

Another aspect of the invention is to provide a lens comprising an array of fiber optic cable strands inclined at an angle to a light source.

10       Another aspect of the invention is to provide a lens comprising an array of short fiber optic cable strands.

Another aspect of the invention is to provide a lens comprising an array of fiber optic cable strands which discriminate between different light sources.

15       Another aspect of the invention is to provide a lens comprising fiber optic strands coordinated with a vehicle surface in such a way as to render a marker lens invisible when not is use.

Other aspects of the invention will be pointed out or made obvious by the following description of the invention and the accompanying drawings.

20       The invention is a lens. The light transmitting portion of the lens comprises a plurality of fiber optic strands forming an array arranged parallel to each other in a side-by-side manner. The fiber optic strands are also inclined at an angle to a surface of the lens. This defeats any direct reflection from the interior of the lens, which gives virtual invisibility to the lens face when not in use. It also allows the lens to transmit the color of a reflective panel disposed behind the lens. In operation, with the light source illuminated, the lens is then lit displaying the color of the light source or of the

color of the strands or both. In an alternate embodiment, the strands are arranged so that different groups of strands are each is focused on one or a group of light sources in an array of light sources.

5

#### Brief Description of the Drawings

The accompanying drawings, which are incorporated in and form a part of the specification, illustrate preferred embodiments of the present invention, and together with a description, serve to explain the principles of the invention.

Fig. 1 is an elevation view of the prior art.

Fig. 2 is an elevation view of the inventive lens in operation.

15 Fig. 3 is a rotated sectional view of the inventive lens.

Fig. 4 is a plan view of light transmitting elements.

#### Detailed Description of the Preferred Embodiment

20 Fig. 1 is an elevation view of the prior art. The prior art lens A is shown on a vehicle bumper. The lens is immediately apparent on the surface of the bumper.

Fig. 2 is an elevation view of the inventive lens in operation. The lens 100 is shown in the same position as the prior art lens. The surface of lens 100 is flush with the outer surface of the bumper. The lens is an integral part of the bumper structure and as such no surface features of the lens are present, such as ridges or depressions.

25 30 Fig. 3 is a rotated sectional view of the inventive lens. A plurality of fiber optic strands or light transmitting elements 10 forming an array or bundle are

arranged parallel to each other in a side-by-side manner. The strands comprise those known in the art having a core and cladding with different refractive indexes. The strands are embedded or molded into the material comprising the bumper 11 or other vehicle structural component.

The bundled fiber optic strands form a substantially planar surface. However, one skilled in the art can appreciate that the strands may also be arranged so that the form of the lens conforms to any contour required by a designer. The axis of the fiber optic strands in the lens is inclined at an angle  $\alpha$  to a normal to surface 15. Angle  $\alpha$  is typically in the range of  $0^\circ$  to  $45^\circ$ . The optimum angle is determined by the location of the major axis of each strand as compared to the location of the light source 13. More distant strands may be angled more severely toward the light source. Strands adjacent to the light source being less inclined.

In an alternate embodiment, the strands are arranged so the axis of each strand is aligned with a single light source in an array of light sources. This assures maximum light gathering by each strand as a function of the light acceptance angle of each optical fiber. One skilled in the art can appreciate that different parts of the lens may have strands that are oriented toward different light sources, depending on the number and location of the light sources.

The ends 16 of the fiber optic strands are flush with an outer surface 15 of the bumper or other structure. Outer surface 15 is generally transparent, although a tint may be added as required by a user. Outer surface 15 may also have a thickness on the order of 0.5mm, so no structural



feature of the lens appears on the otherwise continuous outer surface of the bumper or other component.

A reflective surface 12 is placed substantially parallel to and located to one side of the planar surface or layer of the fiber optic strands opposite the outer surface 15. A light source 13 is placed between the reflective surface and the planar surface. A light ray 14 emitted by the light source is typically reflected by the reflective surface. It is received through an end 17 of a fiber optic strand. The light ray is transmitted through the fiber optic strand and emitted from end 16. The reflective surface may also comprise a series of reflective ridges that more efficiently reflect and thereby direct the light rays from the light source toward ends 17. The form of each ridge depends on the location of each strand in the array. The shape and arrangement of the ridges is also a function of the numerical aperture of the strands and enhances coupling the light from the light source to the strands.

A plurality or array of light sources may also be included, depending on the needs of the user. For example, a yellow light source and a red light source may be used to depict a turn signal (yellow) and a brake signal (red). The light source may comprise a RGB LED or any other light source known in the art. Each light source may also comprise the termination of a fiber optic cable routed from a remote light source.

In an alternate embodiment, a plurality of fiber optic light sources may each be connected to the end 17 of each strand. Each fiber optic light source would then be individually controllable allowing customization of the appearance of the lens during operation. The lens could

display a variety of colors or text, for example "STOP", as required by a user using known light source control methods and apparatus.

5 The diameter of the fiber optic strands is in the range of 10 $\mu$ m up to 1 cm. The thickness,  $t$ , of the fiber optic bundle layer is set according to the design needs of the user.

10 Fig. 4 is a plan view of light transmitting elements. Strands 10 each have a diameter  $d_1$ . The figure depicts a set of three strands, although the relationship can be applied to any number of strands. Connecting tangent points taken on each adjacent strand results in a triangle. Generally, the triangle will be equilateral. A line drawn from a tangent point to the center of an opposing line will have a  
15 length  $d_2$ . In the preferred embodiment,  $d_2 < d_1$ . The intensity of the transmitted light from the lens is a function of this relationship. Increasing  $d_1$  while holding  $d_2$  constant will increase the intensity of the emitted light. On the other hand, decreasing  $d_1$  while holding  $d_2$   
20 constant will decrease emitted light while enhancing the chameleon effect, that is, rendering the location and appearance of the lens undetectable by an observer when the light source is not illuminated.

25 Although a single form of the invention has been described herein, it will be obvious to those skilled in the art that variations may be made in the construction and relation of parts without departing from the spirit and scope of the invention described herein.

### Abstract

The invention is a lens. The light transmitting portion of the lens comprises a plurality of fiber optic strands arranged parallel to each other in a side-by-side manner, forming a planar layer. The fiber optic strands are also inclined at an angle to a surface of the lens. This defeats any reflection from the interior of the lens, which gives virtual invisibility to the lens face or surface when the light source is not in use. In operation, when a light source is illuminated, the lens is then lit, displaying the color of the light source or of the color of the strands.

## Claims

I claim:

1. A signal lens system comprising:

a light source;

5 a reflective surface;

a plurality of light transmitting elements arranged adjacent and parallel to each other to form a substantially planar layer; and

10 the light source located between the reflective surface and the planar layer.

2. The signal lens as in claim 1, wherein the light transmitting elements each have a central axis that is inclined to a reflective surface at an angle in the range of 0° to 45°.

3. The signal lens as in claim 2 further comprising a plurality of light sources.

20 4. The signal lens as in claim 3 wherein each light source is aligned with at least one light transmitting element.

25 5. The signal lens as in claim 4, wherein an outer surface of each light transmitting element is coplanar with each adjacent light transmitting element outer surface.

6. The signal lens as in claim 5, whereby:

a first line drawn between adjacent light transmitting elements when bisected by a second line normal to the first line drawn from a tangent point on a third light transmitting element, the second line having a length  $d_2$ ;

the light transmitting elements each having a diameter  $d_1$ ; and  
 $d_2 < d_1$ .

5 7. A lens comprising:

a reflective surface; and

a plurality of light transmitting elements arranged adjacent and parallel to each other to form a bundle describing a substantially planar layer; and

10 the reflective surface arranged substantially parallel to the planar layer whereby a light may be reflected from the reflective surface and received by at least one fiber optic strand.

15 8. A lens comprising:

a plurality of light transmitting elements arranged adjacent and parallel to each other to form a bundle describing a substantially planar layer.

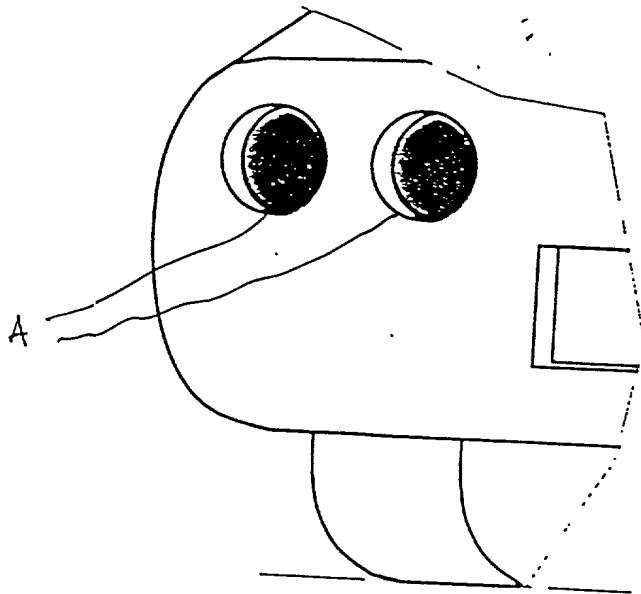


FIG. 1  
PRIOR ART

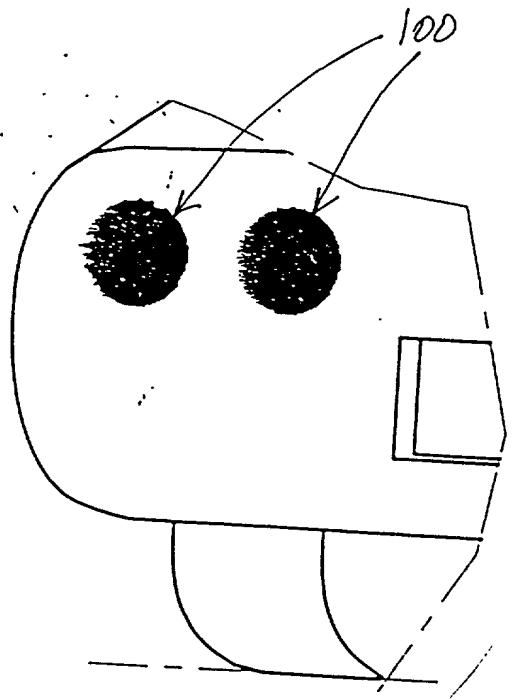


FIG. 2

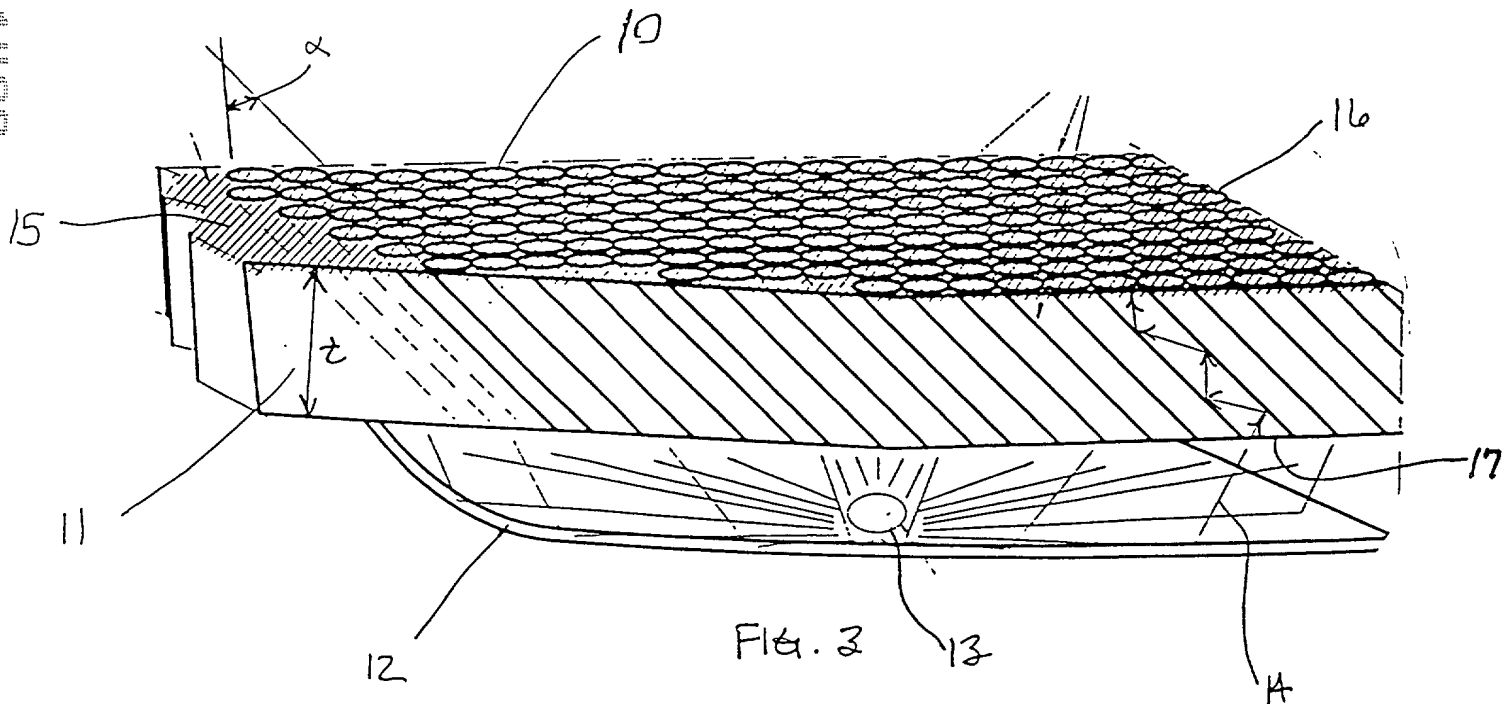


FIG. 3

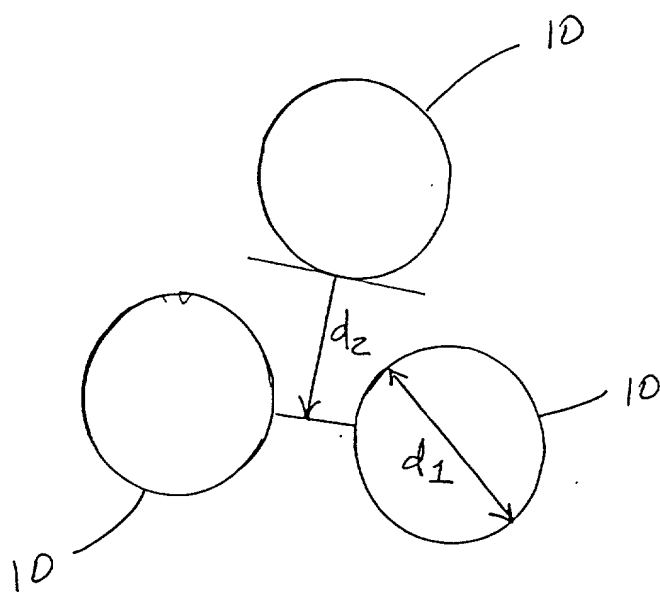


FIG. 9

Docket No.

000-009A

# Declaration and Power of Attorney For Patent Application

## English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"LENS"

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on \_\_\_\_\_ as United States Application No. or PCT International Application Number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

N/A

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐



I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

N/A	
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

N/A		
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

CASTLEMAN; Curtis	Reg. No. 25,495
AUSTIN; Steven	Reg. No. 34,541
THURNAU; Jeffrey	Reg. No. 42,183
OLSON; Maria	Reg. No. 40,111

Send Correspondence to:

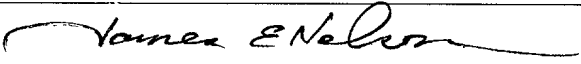
Jeffrey Thurnau  
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Jeffrey Thurnau (303) 744-4743

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Rule 47(b) Applicant

<b>NELSON; James E., V.P. General Counsel, The Gates Corporation</b>	
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